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10/719,014	11/24/2003	Nikolai N. Issaev	08935-291001 / M-5027	9164
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FISH & RICHARDSON PC P.O. BOX 1022 MINNEAPOLIS, MN 55440-1022			EXAMINER TALBOT, BRIAN K	
			ART UNIT	PAPER NUMBER
			1792	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PATDOCTC@fr.com

Office Action Summary

Application No.

10/719,014

Applicant(s)

ISSAEV ET AL.

Examiner

Brian K. Talbot

Art Unit

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 September 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20, 22-25, 27-34, 36-39, 41-50 and 52-65 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

- 5) ☐ Claim(s) _____ is/are allowed.

- 6) ☒ Claim(s) 1-20, 23-25, 27-34, 37-39, 41-50 and 52-65 is/are rejected.

- 7) ☒ Claim(s) 22, 36 is/are objected to.

- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/06)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

1. The amendment filed 9/30/08 has been considered and entered. Claim 65 has been added. Claims 1-20,22-25,27-34,37-39,41-50 and 52-65 remain in the application.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
3. In light of the amendment filed 9/30/08, the objection to the specification concerning the title has been withdrawn.

Claim Rejections - 35 USC § 103

4. Claims 1-20,23-25,27-34,37-39,41-50 and 52-65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeuchi et al. (5,543,249) in combination with Michel et al. (2004/0264110) further in combination with Tischer et al. ("Candidate materials for the sulfur electrode current collector", Corrosion Science, Vol. 26, No. 5, pp. 377-388, 1986) still further in combination with Marincic et al. (5,554,463) (a) alone or (b) further in combination with Sakamoto et al. (6,447,957).

Takeuchi et al. (5,543,249) teaches an aqueous blended electrode material for use in electrochemical cells and manufacture. Takeuchi et al. (5,543,249) teaches forming cathode powder mixture, spreading onto an expanded metal grid and calendaring to form the cathode laminate. The laminate is then heated and cut to size and rolled to final thickness (Fig. 2 and col. 3, line 25 – col. 4, line 5). The cathode active material includes, fluorinated carbon, manganese

dioxide, iron disulfide, etc (col. 2, lines 40-58). A polymer binder is added to the cathode active material as well as the carbon material to form the cathode active material. The expanded metal screen or grid is preferably aluminum (col. 3, line 45). Takeuchi et al. (5,543,249) teaches that slurry application is also known (col. 1, line 25-55).

Takeuchi et al. (5,543,249) fails to teach a current collector that includes pulling the grid having an initial tensile strength and increasing the tensile strength by the pulling step.

Michel et al. (2004/0264110) teaches electrodes and production thereof whereby an aluminum current collector is stretched prior to application of a cathode active material ([0013]-[0026] and [0036]). The perforations (5) are square, i.e. diamond-shaped as depicted in Figs. 2-5.

Therefore it would have been obvious to have modified Takeuchi et al. (5,543,249) battery to include a current collector that is pulled prior to coating with the cathode active material as evidenced by Michel et al. (2004/0264110) with the expectation of achieving the benefits associated therewith, i.e. increased surface area and tensile strength.

Takeuchi et al. (5,543,249) in combination with Michel et al. (2004/0264110) fails to teach a tensile strength of the pulled grid to be greater than 5 lb/in as well as the claimed 6061 aluminum alloy grid.

Tischer et al ("Candidate materials for the sulfur electrode current collector", Corrosion Science, Vol. 26, No. 5, pp. 377-388, 1986) discloses a positive current collector for a battery comprising a 6061 aluminum alloy (See Introduction and Table 1). Examiner's note: A 6061 aluminum alloy has the following properties: tensile strength of 18100 psi, yield strength of 7980 psi, and a resistivity of 3.7e-006 ohm-cm.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Takeuchi et al. (5,543,249) in combination with Michel et al. (2004/0264110) battery to include a current collector that includes an aluminum alloy that is a 6000 series aluminum alloy including 0.04-0.4% by weight of chromium, 0.01-6.8% by weight of copper, 0.1-7% by weight of magnesium, 0.15% or less by weight of manganese, and 0.4-0.8% by weight of silicon; an aluminum alloy including 0.15-0.4% by weight of copper, 0.7% or less by weight of iron, 0.8-1.2% by weight of magnesium, 0.1% or less by weight of titanium, and 0.25% or less by weight of zinc; a current collector that has a yield strength of at least 2.0 lb/in; a current collector that has a yield strength of at least 5 lb/in; a current collector that has a tensile strength of at least 5 lb/in; a current collector that has a tensile strength of at least 7 lb/in; a current collector that has a yield strength of at least 2.0 lb/in and a tensile strength of at least 5 lb/in; a current collector that has a resistivity of less than 10 mΩ/cm; and a current collector including a 6061 aluminum alloy as evidenced by Tischer et al ("Candidate materials for the sulfur electrode current collector", *Corrosion Science*, Vol. 26, No. 5, pp. 377-388, 1986) in order to utilize an aluminum alloy that is highly corrosion resistant even at high temperatures.

Takeuchi et al. (5,543,249) in combination with Michel et al. (2004/0264110) further in combination with Tischer et al ("Candidate materials for the sulfur electrode current collector", *Corrosion Science*, Vol. 26, No. 5, pp. 377-388, 1986) fail to teach pulling along a direction other than the length of any boundary of the diamond shaped grid.

Marincic et al. (5,554,463) teaches a current collector for electrochemical cell whereby a current collector having diamond-shaped grid is pulled or stretched along a direction other than the length of any boundary of the diamond shaped grid (Fig. 1 and col. 6-18).

Therefore it would have been obvious at the time the invention was made to have modified Takeuchi et al. (5,543,249) in combination with Michel et al. (2004/0264110) further in combination with Tischer et al ("Candidate materials for the sulfur electrode current collector", Corrosion Science, Vol. 26, No. 5, pp. 377-388, 1986) process by pulling/stretching the grid in the claimed direction as evidenced by Marincic et al. (5,554,463) with the expectation of achieving similar success.

(b) Takeuchi et al. (5,543,249) in combination with Michel et al. (2004/0264110) further in combination with Tischer et al ("Candidate materials for the sulfur electrode current collector", Corrosion Science, Vol. 26, No. 5, pp. 377-388, 1986) still further in combination with Marincic et al. (5,554,463) fails to explicitly teach diamond-shaped perforation in the current collector.

Features detailed above are incorporated here concerning Takeuchi et al. (5,543,249) in combination with Michel et al. (2004/0264110) further in combination with Tischer et al ("Candidate materials for the sulfur electrode current collector", Corrosion Science, Vol. 26, No. 5, pp. 377-388, 1986) still further in combination with Marincic et al. (5,554,463) (a) alone are incorporated here.

Sakamoto et al. (6,447,957) teaches diamond-shaped perforations in a current collector (abstract and Figs. 1-3).

Therefore it would have been obvious for one skilled in the art at the time the invention was made to have modified Takeuchi et al. (5,543,249) in combination with Michel et al. (2004/0264110) further in combination with Tischer et al ("Candidate materials for the sulfur

electrode current collector”, Corrosion Science, Vol. 26, No. 5, pp. 377-388, 1986) process by including diamond-shaped perforation in the current collector as evidence by Sakamoto et al. (6,447,957) with the expectation of achieving similar success.

Allowable Subject Matter

5. Claims 22 and 36 are allowed.

Reasons for Allowance

6. The following is an examiner’s statement of reasons for allowance:

The prior art of record fails to teach or fairly suggest a method of making a cathode for a primary battery comprising pulling an expanded grid and leveling a expanded grid prior to coating with a cathode material. The prior art teaches pulling but does not teach a leveling step in addition thereto.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance.”

Response to Amendment

7. Applicant's arguments with respect to claims 1-20,23-25,27-34,37-39,41-50 and 52-64 have been considered but are moot in view of the new ground(s) of rejection.

Applicant argued that the leveling is different as it is done by rollers and not during the pulling/stretching step and has now claimed it as such.

The examiner agrees and therefore has indicated those claims directed toward both a pulling and leveling step as being allowable.

Applicant argued that the combination of prior art fails to teach pulling an expanded grid having an increase in short dimension of the openings and increasing the tensile strength to greater than 5 lb/in.

The Examiner disagrees as detailed in the rejection above.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian K. Talbot whose telephone number is (571) 272-1428. The examiner can normally be reached on Monday-Friday 6AM-3PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy H. Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Brian K Talbot/
Primary Examiner, Art Unit 1792

BKT